

Quanterra  
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0052755

## CERTIFICATE OF ANALYSIS

Bechtel Hanford, Inc.  
 3350 George Washington Way  
 Richland, WA 99352

February 2, 2000

Attention: Joan Kessner

SAF Number : B00-02118  
 Date SDG Closed : January 4, 2000  
 Number of Samples : One (1)  
 Sample Type : Other (Air Filter)  
 SDG Number : W03003  
 Data Deliverable : 7 Day / Summary

**RECEIVED**  
 MAR 20 2000

**EDMC**

### I. Introduction

On January 4, 2000, one air filter (matrix: other) sample was received at the Quanterra Richland Laboratory (QRL) for radiochemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Bechtel Hanford, Inc. (BHI) specific ID:

**QRL ID#**  
 9D72TH10

**BHI ID#**  
 RCF6924  
 AIR-100SMT-99-  
 0005

**MATRIX**  
 OTHER

**DATE OF RECEIPT**  
 1/4/00

### II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

#### **Gas Proportional Counting**

Gross Alpha by method RICH-RC-5014

Gross Beta by method RICH-RC-5014

#### **Alpha Spectroscopy**

Plutonium-238, -239/40 by method RICH-RC-5010

Americium-241 by method RICH-RC-5080

Curium-244 by method RICH-RC-5080

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Uranium-234, -235, -238 by method RICH-RC-5079  
**Gamma Spectroscopy**  
Gamma Scan by method RICH-RC-5017  
**Liquid Scintillation Counting**  
Nickel-63 by method RICH-RC-5069

### III. Quality Control

The analytical results for each analysis performed under SDG W03003 include a minimum of one Laboratory Control Sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

### IV. Comments

#### **Gas Proportional Counting**

Gross Alpha by method RICH-RC-5014:

The LCS, batch blank and sample results are within contractual requirements. The gross alpha determination was a direct count of the filter sample, therefore a duplicate analysis is not included in this analytical batch.

Gross Beta by method RICH-RC-5014:

The LCS, batch blank and sample results are within contractual requirements. The gross beta determination was a direct count of the filter sample, therefore a duplicate analysis is not included in this analytical batch.

#### **Alpha Spectroscopy**

Plutonium-238, -239/40 by method RICH-RC-5010:

The LCS, batch blank, sample and sample duplicate (RCF6924) results are within contractual requirements.

Americium-241 by method RICH-RC-5080:

The LCS, batch blank, sample and sample duplicate (RCF6924) results are within contractual requirements.

Curium-244 by method RICH-RC-5080:

The LCS, batch blank, sample and sample duplicate (RCF6924) results are within contractual requirements.

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Uranium-234, -235, -238 by method RICH-RC-5079:

The LCS, batch blank, sample and sample duplicate (RCF6924) results are within contractual requirements.

**Gamma Spectroscopy**

Gamma Scan by method RICH-RC-5017:

The LCS, batch blank, sample and sample duplicate (RCF6924) results are within contractual requirements.

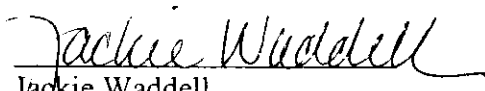
**Liquid Scintillation Counting**

Nickel-63 by method RICH-RC-5069:

The LCS recovery is below the minimum limit (70%) at 62%. The sample and duplicate analysis results are significantly below the CRDL, therefore with approval by J.Kessner (2/2/00), the data are accepted for reporting. Except as noted, the batch blank, sample, sample duplicate and sample matrix spike (RCF6924) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:

  
Jackie Waddell  
Project Manager

## SAMPLE RESULTS

LAB NAME:	QUANTERRA, Richland	SDG: /RPT GRP:	W03003 / 9444
LAB SAMPLE ID:	9D72TH10	MATRIX:	FILTER
CLIENT ID:	RCF 6924 AIR-1	DATE RECEIVED:	1/4/2000 1:52:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	2.97E+00		6.6E-01	8.4E-01	1.50E-01	pCi/sa	108.82%	RICHRC5080
CM-242	0.00E+00	U	0.0E+00	1.0E-01	1.13E-01	pCi/sa	108.82%	RICHRC5080
CM-244	3.72E-02	U	7.4E-02	7.5E-02	1.01E-01	pCi/sa	108.82%	RICHRC5080
PU-238	5.75E-01		3.1E-01	3.2E-01	1.11E-01	pCi/sa	73.00%	RICHRC5010
PU239/40	4.64E+00		8.7E-01	1.2E+00	1.11E-01	pCi/sa	73.00%	RICHRC5010
U-234	-3.57E-02	U	2.4E-02	2.5E-02	3.29E-01	pCi/sa	83.10%	RICHRC5079
U-235	1.78E-02	U	1.0E-01	1.0E-01	3.18E-01	pCi/sa	83.10%	RICHRC5079
U-238	2.22E-01	U	2.8E-01	2.9E-01	5.66E-01	pCi/sa	83.10%	RICHRC5079
CO-60	4.95E+02		5.2E+01	5.2E+01	5.04E+00	pCi/sa		RICHRC5017
CS-137	4.15E+01		7.1E+00	7.1E+00	4.45E+00	pCi/sa		RICHRC5017
EU-152	9.58E-02	U	4.5E+00	4.5E+00	7.52E+00	pCi/sa		RICHRC5017
EU-154	3.34E+01	U	1.5E+01	1.5E+01	1.83E+01	pCi/sa		RICHRC5017
EU-155	6.64E+00	U	4.4E+00	4.4E+00	5.46E+00	pCi/sa		RICHRC5017
ALPHA	1.61E+01		8.5E+00	9.1E+00	3.47E-01	pCi/sa	100.00%	RICHRC5036
BETA	5.00E+02		6.1E+00	7.9E+01	6.11E-01	pCi/sa	100.00%	RICHRC5036
NI-63	2.27E+00		1.3E-01	1.0E+00	1.73E+00	pCi/sa	92.24%	RICHRC5069

Number of Results: 16

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result <

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**DUPLICATE RESULTS**

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72TH1AR MATRIX: FILTER  
CLIENT ID: RCF 6924 AIR-1 DATE RECEIVED: 1/4/2000 1:52:00 P  
ORIG LAB SAMPLE ID: 9D72TH10

ANALYTE	DUP RESULT	Q	COUNTING ERROR ( 2 s)	TOTAL ERROR ( 2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
AM-241	3.03E+00		7.2E-01	9.0E-01	1.16E-01	pCi/sa	93.41%	RICHRC5080	2.97E+00	1.92%
CM-242	0.00E+00	U	0.0E+00	1.2E-01	1.29E-01	pCi/sa	93.41%	RICHRC5080	0.00E+00	0.00%
CM-244	1.28E-01		1.5E-01	1.5E-01	1.16E-01	pCi/sa	93.41%	RICHRC5080	3.72E-02	109.96%

Number of Results: 3

**DUPLICATE RESULTS**

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72TH1CR MATRIX: FILTER  
CLIENT ID: RCF 6924 AIR-1 DATE RECEIVED: 1/4/2000 1:52:00 P  
ORIG LAB SAMPLE ID: 9D72TH10

ANALYTE	DUP RESULT	Q	COUNTING ERROR ( 2 s)	TOTAL ERROR ( 2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
U-234	2.35E-02	U	1.3E-01	1.3E-01	4.20E-01	pCi/sa	64.09%	RICHRC5079	-3.57E-02	970.78%
U-235	-1.05E-02	U	1.5E-02	1.5E-02	2.99E-01	pCi/sa	64.09%	RICHRC5079	1.78E-02	771.33%
U-238	-2.62E-02	U	2.3E-02	2.4E-02	3.69E-01	pCi/sa	64.09%	RICHRC5079	2.22E-01	253.55%

Number of Results: 3

## DUPLICATE RESULTS

**LAB NAME:** QUANTERRA, Richland      **SDG: /RPT GRP:** W03003 / 9444  
**LAB SAMPLE ID:** D72TH1DR      **MATRIX:** FILTER  
**CLIENT ID:** RCF 6924 AIR-1      **DATE RECEIVED:** 1/4/2000 1:52:00 P  
**ORIG LAB SAMPLE ID:** 9D72TH10

ANALYTE	DUP RESULT	COUNTING Q ERROR ( 2 s)	TOTAL ERROR ( 2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
CO-60	5.00E+02	5.3E+01	5.3E+01	4.94E+00	pCi/sa		RICHRC5017	4.95E+02	1.14%
CS-137	4.33E+01	6.7E+00	6.7E+00	4.74E+00	pCi/sa		RICHRC5017	4.15E+01	4.27%
EU-152	-2.39E+00 U	4.8E+00	4.8E+00	8.09E+00	pCi/sa		RICHRC5017	9.58E-02	216.71%
EU-154	3.15E+01 U	1.0E+01	1.0E+01	1.99E+01	pCi/sa		RICHRC5017	3.34E+01	6.05%
EU-155	2.34E+00 U	3.3E+00	3.3E+00	5.80E+00	pCi/sa		RICHRC5017	6.64E+00	95.57%

Number of Results: 5

## DUPLICATE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72TH1JR MATRIX: FILTER  
CLIENT ID: RCF 6924 AIR-1 DATE RECEIVED: 1/4/2000 1:52:00 P  
ORIG LAB SAMPLE ID: 9D72TH10

ANALYTE	DUP RESULT	Q	COUNTING ERROR ( 2 s)	TOTAL ERROR ( 2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
PU-238	7.45E-01		3.4E-01	3.7E-01	1.06E-01	pCi/sa	76.89%	RICHRC5010	5.75E-01	25.72%
PU239/40	4.58E+00		8.5E-01	1.2E+00	1.06E-01	pCi/sa	76.89%	RICHRC5010	4.64E+00	1.19%

Number of Results: 2

**DUPLICATE RESULTS**

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72TH1LR MATRIX: FILTER  
CLIENT ID: RCF 6924 AIR-1 DATE RECEIVED: 1/4/2000 1:52:00 P  
ORIG LAB SAMPLE ID: 9D72TH10

ANALYTE	DUP RESULT	COUNTING Q ERROR ( 2 s)	TOTAL ERROR ( 2 s)	MDA/ IDL	REPORT UNIT	YIELD	METHOD NUMBER	ORIG RESULT	RPD
NI-63	2.63E+00	1.6E-01	1.0E+00	1.79E+00	pCi/sa	101.82%	RICHRC5069	2.27E+00	14.33%

Number of Results:

**BLANK RESULTS**

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72W611B MATRIX: FILTER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
PU-238	0.00E+00	U	0.0E+00	2.2E-02	2.43E-02	pCi/sa	70.36%	RICHRC5010
PU239/40	0.00E+00	U	0.0E+00	2.2E-02	2.42E-02	pCi/sa	70.36%	RICHRC5010

Number of Results: 2

## BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72W811B MATRIX: FILTER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
AM-241	8.15E-03	U	1.6E-02	1.6E-02	2.21E-02	pCi/sa	100.89%	RICHRC5080
CM-242	1.69E-02	U	2.4E-02	2.4E-02	2.29E-02	pCi/sa	100.89%	RICHRC5080

Number of Results: 2

**BLANK RESULTS**

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W03003 / 9444

LAB SAMPLE ID: D72WF11B MATRIX: FILTER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
U-234	2.27E-02	U	2.9E-02	3.0E-02	4.52E-02	pCi/sa	102.25%	RICHRC5079
U-235	2.20E-02	U	2.9E-02	3.0E-02	4.78E-02	pCi/sa	102.25%	RICHRC5079
U-238	2.91E-02	U	3.4E-02	3.4E-02	5.24E-02	pCi/sa	102.25%	RICHRC5079

Number of Results: 3

**BLANK RESULTS**

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72WJ11B MATRIX: FILTER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
CO-60	6.40E-01	U	1.6E+00	1.6E+00	3.08E+00	pCi/sa		RICHRC5017
CS-137	2.37E-01	U	1.2E+00	1.2E+00	2.14E+00	pCi/sa		RICHRC5017
EU-152	3.71E-01	U	2.9E+00	2.9E+00	4.99E+00	pCi/sa		RICHRC5017
EU-154	-4.18E+00	U	4.2E+00	4.2E+00	6.53E+00	pCi/sa		RICHRC5017
EU-155	-1.65E+00	U	2.0E+00	2.0E+00	3.38E+00	pCi/sa		RICHRC5017

Number of Results: 5

## BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D730E11X MATRIX: FILTER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
ALPHA	3.23E-01		2.4E-01	2.5E-01	3.23E-01	pCi/sa	100.00%	RICHRC5036
BETA	2.12E+00		4.8E-01	5.8E-01	6.49E-01	pCi/sa	100.00%	RICHRC5036

Number of Results: 2

**BLANK RESULTS**

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D761611B MATRIX: FILTER

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
NI-63	1.91E-01	U	1.2E-02	7.9E-01	1.43E+00	pCi/sa	104.06%	RICHRC5069

Number of Results:

**LABORATORY CONTROL SAMPLE**

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72W612S MATRIX: FILTER

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ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
PU239/40	4.25E+00		4.1E-01	8.7E-01	4.58E-02	pCi/sa	63.74%	4.57E+00	93.11%

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Number of Results:

**LABORATORY CONTROL SAMPLE**

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72W812S MATRIX: FILTER

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ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
AM-241	4.26E+00		3.7E-01	8.4E-01	2.15E-02	pCi/sa	105.95%	4.57E+00	93.35%

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Number of Results:

## LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72WF12S MATRIX: FILTER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
U-234	1.36E+00		2.0E-01	3.1E-01	4.90E-02	pCi/sa	114.90%	1.74E+00	78.28%
U-235	6.73E-02		4.6E-02	4.7E-02	3.48E-02	pCi/sa	114.90%	7.92E-02	85.03%
U-238	1.54E+00		2.2E-01	3.5E-01	3.80E-02	pCi/sa	114.90%	1.82E+00	84.97%

Number of Results: 3

Result = IDL When Not Detecte

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result < RDL.

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## LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D72WJ12S MATRIX: FILTER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
CS-137	7.39E+01		9.0E+00	9.0E+00	2.33E+00	pCi/sa		6.93E+01	106.71%

Number of Results: 1

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result < RDL.

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0020

# LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D730E12M MATRIX: FILTER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
ALPHA	4.55E+01		2.3E+00	9.4E+00	2.99E-01	pCi/sa	100.00%	4.57E+01	99.54%
BETA	6.43E+01		2.2E+00	1.0E+01	6.14E-01	pCi/sa	100.00%	9.08E+01	70.84%

Number of Results: 2

Result = IDL When Not Detecte

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result < RDL.

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rptChemRadLcs; v3.41

0021

## LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
LAB SAMPLE ID: D761612S MATRIX: FILTER

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/ IDL	REPORT UNIT	YIELD	EXPECTED	RECOVERY
NI-63	9.39E+01		1.8E+00	7.5E+00	1.53E+00	pCi/sa	111.01%	1.52E+02	61.58%

Number of Results: 1

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,  
J = No U qualifier and result < RDL.

Quanterra Analytical Services, Inc  
rptChemRadLcs; v3.41

0022

# MATRIX SPIKE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W03003 / 9444  
 LAB SAMPLE ID: D72TH1KW MATRIX: FILTER

ANALYTE	SPIKE RESULT* Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s)	MDA/IDL	REPORT UNIT	SAMPLE RESULT	EXPECTED	RECOVERY
NI-63	9.77E+01	2.1E+00	8.2E+00	2.08E+00	pCi/sa	2.27E+00	1.52E+02	64.31%

Number of Results: 1

\*Spike Result Corrected For Sample Result

Result = IDL When Not Detecte

(Q)ualifiers: U = Analyte result < MDA/IDL,

J = No U qualifier and result < RDL.

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 rptChemRadMatrixSpike; v3.41

0023

# Data Review Checklist RADIOCHEMISTRY

Lot Number: <u>JOA040157</u>				
Client ID: <u>BH#</u>				
Due Date: <u>1-11-00</u>				
QC Batch Number: <u>0004330</u>		SDG Number: <u>3003</u>		
Method Test Parameter: <u>Am/cm</u> (501)				
Matrix: <u>Filter</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	✓
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			
2. Were all sample holding times met?	✓			
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			
C. QC Samples				
1. Is the blank yield within acceptance criteria?	✓			
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			
3. Does the blank result meet the Contract criteria?	✓			
4. Is the blank result < the Contract Detection Limit?	✓			
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			
7. Is the LCS yield within acceptance criteria?	✓			
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?	✓			
D. Other				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filled out?	✓			
3. Was the correct methodology used?	✓			
4. Was transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Were units checked?	✓			✓

Comments on any "No" response: \_\_\_\_\_

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First Level Review: Pam Kennedy

Date: 1-13-00

Second Level Review: James Waddell

Date: 1/13/00

# Data Review Checklist RADIOCHEMISTRY

Lot Number: <u>JOA040157</u>				
Client ID: <u>BH2</u>				
Due Date: <u>1-11-00</u>				
QC Batch Number: <u>0004329</u>			SDG Number: <u>W03003</u>	
Method Test Parameter: <u>Plutonium</u>				
Matrix: <u>Filter</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	✓
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			
2. Were all sample holding times met?	✓			
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			
C. QC Samples				
1. Is the blank yield within acceptance criteria?	✓			
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			
3. Does the blank result meet the Contract criteria?	✓			
4. Is the blank result < the Contract Detection Limit?	✓			
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			
7. Is the LCS yield within acceptance criteria?	✓			
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?	✓			
D. Other				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filled out?	✓			
3. Was the correct methodology used?	✓			
4. Was transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Were units checked?	✓			✓

Comments on any "No" response: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

First Level Review: Pam Kershner

Second Level Review: Jackie Waddell

Date: 1-13-00

Date: 1/13/00

Data Review Checklist  
RADIOCHEMISTRY

+ Priority

Lot Number: JCA040157				
Client ID: B47				
Due Date: 1-11-00				
QC Batch Number: 0004333		SDG Number: 3003		
Method Test Parameter: UISO				
Matrix: Filter				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	✓
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			
2. Were all sample holding times met?	✓			
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			
C. QC Samples				
1. Is the blank yield within acceptance criteria?	✓			
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			
3. Does the blank result meet the Contract criteria?	✓			
4. Is the blank result < the Contract Detection Limit?	✓			
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			
7. Is the LCS yield within acceptance criteria?	✓			
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?	✓			
D. Other				
1. Are all Nonconformances included and noted?			✓	
2. Are all required forms filled out?	✓			
3. Was the correct methodology used?	✓			
4. Was transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Were units checked?	✓			✓

Comments on any "No" response: \_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_

First Level Review: Pam Kenton

Second Level Review: Jackie Waddles

Date: 1-12-00

Date: 1/13/00

# Data Review Checklist RADIOCHEMISTRY

Lot Number: <u>JCA040157</u>				
Client ID: <u>BHI</u>				
Due Date: <u>1-6-00</u>				
QC Batch Number: <u>0004334</u>			SDG Number: <u>3003</u>	
Method Test Parameter: <u>gamma</u>				
Matrix: <u>filter</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
<b>A. Calibration</b>				
1. Is the calibration documentation included where applicable?			✓	✓
<b>B. Sample Analysis</b>				
1. Are the sample yields within acceptance criteria?			✓	
2. Were all sample holding times met?	✓			
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			
<b>C. QC Samples</b>				
1. Is the blank yield within acceptance criteria?			✓	
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			
3. Does the blank result meet the Contract criteria?	✓			
4. Is the blank result < the Contract Detection Limit?	✓			
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?	✓			
7. Is the LCS yield within acceptance criteria?			✓	
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?	✓			
<b>D. Other</b>				
1. Are all Nonconformances included and noted?				
2. Are all required forms filled out?	✓			
3. Was the correct methodology used?	✓			
4. Was transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Were units checked?	✓			✓

Comments on any "No" response: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

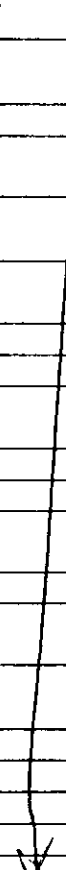
\_\_\_\_\_

\_\_\_\_\_

First Level Review: Pam Kenney Date: 1-6-00

Second Level Review: Achie Wadell Date: 1/6/00

# Data Review Checklist RADIOCHEMISTRY

Lot Number: <u>JOA040157</u>				
Client ID: <u>BHI</u>				
Due Date: <u>1/11/00</u>				
QC Batch Number: <u>0004353</u>			SDG Number: <u>3005</u>	
Method Test Parameter: <u>S9- d/B</u>				
Matrix: <u>air</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			-	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?			-	
2. Were all sample holding times met?			-	
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			
C. QC Samples				
1. Is the blank yield within acceptance criteria?			✓	
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			
3. Does the blank result meet the Contract criteria?	✓			
4. Is the blank result < the Contract Detection Limit?	✓			
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			-	
6. Is the LCS result within acceptance criteria?	✓			
7. Is the LCS yield within acceptance criteria?			✓	
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			
9. Do the MS/MSD results and yields meet acceptance criteria?			✓	
10. Do the duplicate sample results and yields meet acceptance criteria?			✓	
D. Other				
1. Are all Nonconformances included and noted?			-	
2. Are all required forms filled out?	✓			
3. Was the correct methodology used?	✓			
4. Was transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Were units checked?	✓			

Comments on any "No" response: \_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

First Level Review: Robert Whelchel

Date: 1/5/00

Second Level Review: [Signature]

Date: 2/3/00

# Data Review Checklist RADIOCHEMISTRY

Lot Number: <u>394048157</u>				
Client ID: <u>BHE</u>				
Due Date: <u>1/11/00</u>				
QC Batch Number: <u>00016412</u>			SDG Number: <u>3003</u>	
Method Test Parameter: <u>S4-NI63</u>				
Matrix: <u>filter</u>				
Review Item	Yes (✓)	No (✓)	N/A (✓)	2 <sup>nd</sup> Level Review (✓)
A. Calibration				
1. Is the calibration documentation included where applicable?			✓	
B. Sample Analysis				
1. Are the sample yields within acceptance criteria?	✓			
2. Were all sample holding times met?	✓			
3. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	✓			
C. QC Samples				
1. Is the blank yield within acceptance criteria?	✓			
2. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	✓			
3. Does the blank result meet the Contract criteria?	✓			
4. Is the blank result < the Contract Detection Limit?	✓			
5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			✓	
6. Is the LCS result within acceptance criteria?		✓		
7. Is the LCS yield within acceptance criteria?	✓			
8. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	✓			
9. Do the MS/MSD results and yields meet acceptance criteria?	✓			✓ <u>2/1/00</u>
10. Do the duplicate sample results and yields meet acceptance criteria?	✓			
D. Other				
1. Are all Nonconformances included and noted?	✓			
2. Are all required forms filled out?	✓			
3. Was the correct methodology used?	✓			
4. Was transcription checked?	✓			
5. Were all calculations checked at a minimum frequency?	✓			
6. Were units checked?	✓			

Comments on any "No" response: LCS recovery low - NCM 1121

First Level Review: Jackie Woodcock

Date: 1/21/00

Second Level Review: [Signature]

Date: 2/3/00



# Nonconformance Memo

NCM #: <b>J01121</b>	Classification: <b>Anomaly</b>
NCM Initiated By: <b>Jackie Waddell</b>	Status: <b>CLOSED</b>
Date Opened: <b>02/02/00</b>	Production Area: <b>Environmental - Sep</b>
Date Closed: <b>02/03/00</b>	Tests: <b>Ni-63 by LSC</b>
	Lot #'s (Sample #'s): <b>J0A040157 (1); J0A060000 (412)</b>
	QC Batch: <b>0006412</b>

Nonconformance: **LCS result out of limits**  
Subcategory: **Analyte was recovered low in the LCS**

## Problem Description / Root Cause

<u>Name</u>	<u>Date</u>	<u>Description</u>
Jackie Waddell	02/02/00	Root cause unknown.

## Corrective Action

<u>Name</u>	<u>Date</u>	<u>Corrective Action</u>
Jackie Waddell	02/02/00	Report results; data accepted per client 1/21/00.

## Quality Assurance Verification

<u>Verified By</u>	<u>Due Date</u>	<u>Status</u>	<u>Notes:</u>
Jodie Carnes	N/A	Verified/completed	

## Client Notification Summary

<u>Client</u>	<u>Project Manager</u>	<u>Date Notified</u>	<u>Response Date</u>	<u>How Notified</u>
BECHTEL HANFORD, INC.	Jackie Waddell	02/03/00	02/03/00	by narrative
	<u>Response</u>	<u>Response Details</u>		
	No response saved			

## Approval History

<u>Name</u>	<u>Date Approved:</u>	<u>Position</u>
Jackie Waddell	02/02/00	Project Manager
Dale OConnell	02/03/00	Group Leader
Jodie Carnes	02/03/00	Quality Assurance

## CHAIN OF CUSTODY

Q-27038

Bechtel Hanford Inc.		CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST						Page 1 of 1					
Collector <b>UNKNOWN / PROJECTS</b>	Company Contact <b>Diane Jacques</b>	Telephone No. <b>509-313-5299</b>	Project Coordinator <b>S. Trent</b>		Price Code <b>9J</b>		Data Turnaround						
Project Designation <b>100-N FPT Area</b>	Sampling Location <b>100-N Area</b>		SAF No. <b>N/A</b>		Air Quality <input type="checkbox"/>		<b>7 days</b>						
Ice Chest No. <b>ERC 99-033</b>	Field Logbook No. <b>N/A</b>	COA <b>B100SM 2W.2</b>	Method of Shipment <b>Hand Delivery - Govt. Vehicle</b>										
Shipped To <b>Quincy - Richland</b>	Offsite Property No.		Bill of Lading/Air Bill No. <b>N/A</b>										
POSSIBLE SAMPLE HAZARDS/REMARKS <b>Potential Radioactivity            &lt; 2000 pCi/gm</b>  Special Handling and/or Storage <b>Cool to 4 degrees C DAS 1/4/00</b>			Preservation	<b>None</b>									
			Type of Container	<b>ENV.</b>									
			No. of Container(s)	<b>1</b>									
			Volume	<b>1g</b>									
<b>SDA</b> <b>W03003</b> <b>JOA040157</b>			<b>See below #1</b>					<b>Received without previous chain of custody documentation provided by collector/project</b>					
Sample No.	Matrix *	Sample Date	Sample Time										
<b>RCF6924</b>	<b>Filter</b>	<b>12/17/99</b>	<b>1245</b>	<b>X</b>									
<b>AIR-100SMT-99-0005</b>													
<b>072TH</b>													
CHAIN OF POSSESSION			Sign/Print Names			SPECIAL INSTRUCTIONS							
Relinquished By <b>R. Thoren</b> Date/Time <b>1-4-00 1300</b>			Received By <b>R. Thoren</b> Date/Time <b>1-4-00 1300</b>			<b>#1 Filter to be analyzed for Gross Alpha/Gross Beta; GEA; AEA (including Isotopic Plutonium; Isotopic Uranium, Isotopic Am-241, and Curium 242/244)</b>							
Relinquished By <b>R. Thoren</b> Date/Time <b>1-4-00/1352</b>			Received By <b>R. Thoren</b> Date/Time <b>1-4-00 1352</b>										
Relinquished By <b>R. Thoren</b> Date/Time <b>1-4-00/1352</b>			Received By <b>R. Thoren</b> Date/Time <b>1-4-00 1352</b>										
Relinquished By <b>R. Thoren</b> Date/Time <b>1-4-00/1352</b>			Received By <b>R. Thoren</b> Date/Time <b>1-4-00 1352</b>										
Relinquished By <b>R. Thoren</b> Date/Time <b>1-4-00/1352</b>			Received By <b>R. Thoren</b> Date/Time <b>1-4-00 1352</b>										
Relinquished By <b>R. Thoren</b> Date/Time <b>1-4-00/1352</b>			Received By <b>R. Thoren</b> Date/Time <b>1-4-00 1352</b>			Matrix *							
Relinquished By <b>R. Thoren</b> Date/Time <b>1-4-00/1352</b>			Received By <b>R. Thoren</b> Date/Time <b>1-4-00 1352</b>			S=Soil SE=Sediment SO=Solid S=Sludge W=Water O=Oil A=Air DS=Dry Solids DL=Dry Liquids T=Tissue WI=Wipe L=Liquid V=Vegetation X=Other							
LABORATORY SECTION		Received By		Title				Date/Time					
FINAL SAMPLE DISPOSITION		Disposal Method		Disposed By				Date/Time					

**ERC Radiological Control**  
**AIR SAMPLE EVALUATION RECORD (Continued)**  
**Air Sample Data**

Page 2 of     

Flow Rate (Lpm):

Flow rate (ft<sup>3</sup>/min.):

Sampling duration (min.):

Total Vol. (ft<sup>3</sup>): 348

**Counting Data**

F - Field Count, B - Bench Count, FF - Filter Fraction (Filter media collection efficiency is established in BHI-SH-04, Appendix C)

**Sample Results**

**Counting  
RCT**

F/B	α/βγ	Date/Time counted	Gross counts	Count Time	Gross cpm	BKG cpm	Net cpm	Eff.	Activity dpm	MDA dpm	FF	μCi/cc	DAC	(α + β) Total DAC	Initials
B	α	12-28-99	36	10	3.6	0.2	3.4	.213	15.96	3.9	1	9.3E-13	.47		
	βγ	0805	3420	10	342	103	239	.371	644	35.6	1	3.8E-11	.02	.49	
	α														
	βγ														
	α														
	βγ														
	α														
	βγ														
	α														
	βγ														
	α														
	βγ														

Respiratory Protection Worn ☐ Y ☐ N

PF:

Isotope:

DAC Value:

μCi/cc

Sample sent to RCF for further analysis? ☐ Y ☐ N

Type / Reason:

Isotope:

DAC Value:

μCi/cc

RCF Sample #:

Filter data received from RCF and attached? ☐ Y ☐ N

$$\text{general } \mu\text{Ci/cc} = \frac{(2.0E - 11)(\text{dpm})}{(\text{Vol.})(\text{FF})}$$

$$\text{filter fraction} = \frac{\text{Counted Area}}{\text{Collection Area}}$$

$$\text{impactor } \alpha \mu\text{Ci/cc} = \frac{(3.5E - 11)(\text{dpm})}{(\text{Vol.})}$$

$$\text{DAC} = \frac{\text{sample concentration } (\mu\text{Ci/cc})}{\text{Isotope DAC } (\mu\text{Ci/cc})}$$

$$\text{impactor } \beta \mu\text{Ci/cc} = \frac{(2.5E - 11)(\text{dpm})}{(\text{Vol.})}$$

$$\text{ft}^3/\text{min.} = \frac{\text{Lpm}}{28.3}$$

(Default DAC values)

<sup>239</sup>Pu DAC = 2 E-12 μCi/cc  
<sup>90</sup>Sr DAC = 2 E-9 μCi/cc

(Impactor equations include an estimate of efficiency.)

RCT(s) Name/Sig./Date:

(signatures of all RCTs performing counting and RCT collecting sample)

RCT Supervisor Name/Sig./Date:

**Snider, Timothy J**

---

**From:** Jacques, I D (Duane)  
**Sent:** Tuesday, January 04, 2000 10:54 AM  
**To:** Trent, Stephen J  
**Cc:** Kessner, Joan H; Snider, Timothy J; St John, David A; Thoren, Rikki A  
**Subject:** 100-N Radcon Filter Forwarded for Isotopic Analysis

Steve,

Here's all the info I have right now. The Radcon sample filter was collected from the 100-N Fission Product Trap (FPT) area (ASER# 100SAT-99-0005) and was analyzed at RCF using RCF #6924. The filter needs to be transferred to a standard laboratory and analyzed for the following:

Gross alpha/beta

GEA

AEA (including isotopic uranium, isotopic plutonium, americium-241, and curium-242/244).

The project would like lab protocol QC if possible. The project also requests a 7-day turnaround time or better. The COA for this work is B100SM.2W12. Please get back to me as soon as possible on this sample. It is important that the project gets the data as soon as possible. Thanks.

**Duane Jacques**

MSIN: S3-21

373-5299

COPY

Snider, Timothy J

---

To: Edwards, Thomas A; Patch, Roy F  
Cc: ^BHI Document & Info Services  
Subject: AIR-100SMT-99-0005 (RCF6924)

Tom,


The sample was received on December 21, 1999 in the envelope and no other written information provided. The sample was collected on December 17, and counted in the RCF on December 21. The volume used in the calculation was 9622 liters or 340 cubic feet. As a result, the sample had four days to decay off natural activity.

The Tennelec value is  $7.1 \text{ E-12}$  alpha, and  $4.7 \text{ E-11}$  beta.

As per verbal request a Frisch Grid was completed on RCF6924 which revealed an elevated value three times background around the 5.2 - 5.4 MeV regions. It is suspected the sample may contain Plutonium -239, or Americium -241. No other regions appeared to have elevated counts. The Frisch Grid is a qualitative analysis only.

Background for 5.2 and 5.4 MeV ranged between 7-9 counts. Counts in the same region ranged 22-27. This variance reflects enough activity to discount statistical anomalies.

As always feel free to contact me directly if you require further information.

  
Timothy J. Snider  
RCF Technical Lead  
373-9731

COPY

0035

# ERC Radiological Counting Facility Analysis Report

RCF Number RCF6924

Sample Date & Time 12/17/99 0955

Project ID: 100 Area Reactor Leg SAF Number: None

Date Analyzed \_\_\_\_\_

Sample ID: AIR-100SMT-99-0005

## Gamma Energy Analysis

Nuclide	Activity (uCi/cc)	Error (uCi/cc)	MDC (uCi/cc)
---------	-------------------	----------------	--------------

Analysis not requested

COPY

## Total GEA (uCi/cc)

	Activity (uCi/cc)	Error (uCi/cc)	Alpha MDC (uCi/cc)
Gross Alpha**	7.1E-12	+/- 6.0E-13	2.9E-12
Gross Beta	4.7E-11	+/- 1.1E-12	Beta MDC (uCi/cc)
			2.8E-11

## Definitions:

All errors reported at 2 standard deviations.

N/R = no result or analysis not requested. <MDC = Less than detection limit.

All GEA results reported as "<" list the Minimum Detectable Concentration (MDC) value for that radionuclide.

Rounding error may result in the reported total GEA activity differing from the sum of the > MDC GEA values in the second significant digit.

## For soils and natural samples, the following applies:

The analysis of U-238 is based on the activity of Pa-234m.

The analysis of Np-237 is based on the activity of Pa-233.

U-238dau is the activity of Pb-214 and Bi-214, short lived daughter products of U-238. Equilibrium between parent and daughter products probably does not exist in disturbed materials.

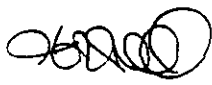
Th-232dau is the activity of Ac-228, Pb-212, and Tl-208, short lived daughter products of Th-232. Equilibrium between parent and daughter products may not exist in disturbed materials.

Other samples, not containing natural materials, may have inapplicable results for the Th, U, transuranics and daughter products. The results must then be balanced for the gross alpha analysis.

\*\*The gross alpha results are not corrected for mass absorption

# No peaks for this radionuclide were visible above background in the spectrum. The result was reported as less than MDC.

Analyst



T. J. Snider

12/27/99

Report To

Tom Edwards

Fax

373-1022

# ERC Radiological Counting Facility

## Air Sample Activity Report - Gross Alpha/Beta

RCF #

6924

Sample Run ID: LB55 2in Unk 15min Pu-Sr - 199912281052 Project/Cust. ID 100 Area Reacto AIR-100SMT-99-0005

Machine LB5500

Report Date: Tuesday, December 28, 1999

SAF # None

Sample ID	Carrier	Sample Type	Sample Volume	Acquisition Date/Time
19991228105210-A3	31	2-in Air Filter	9622 liters	12/28/99 10:52:20 AM

Net Alpha cpm	Alpha dpm	Alpha dpm 2 sigma	Alpha Bkgd cpm	Net Beta cpm	Beta dpm	Beta dpm 2 sigma	Beta Bkgd cpm
58.046	148.966	12.652	1.050	589.590	988.796	23.116	5.589

MDA (dpm)

Beta Efficiency: 59.53%

Alpha

Beta

61.334

599.960

Alpha Efficiency: 38.72%

Alpha $\mu$ Ci/ml	Alpha uCi/ml 2 sigma	Beta $\mu$ Ci/ml	Beta uCi/ml 2 sigma	Alpha MDC (uCi/ml)	Beta MDC (uCi/ml)
7.0E-12	5.9E-13	4.6E-11	1.1E-12	2.9E-12	2.8E-11

COPY

Analyzed By: CEJ Date: 12/28/99Reviewed By: SD Date: 12/29/99

0037

CORRY BY TRAP

5611 / 2-28-99

COPY

DATE/TIME ON	DATE/TIME OFF	FLOW RATE ON	FLOW RATE OFF	VOLUME FT <sup>3</sup>
12-17-99				
0955-	1245	2.0	2.0	
AIR-100SMT-99-0005				

0955-1000-	5
1000-1100	60
1100-1200	60
1200-1245	45

170 minutes

340 cfm.

#AIR-

RC6924

Total Volume \_\_\_\_\_ Ft<sup>3</sup>

13105 BB-2428

# ERC Radiological Counting Facility

## Air Sample Activity Report - Gross Alpha/Beta

RCF #

6924

Sample Run ID: LB55 2in Unk 15min Pu-Sr - 199912211331 Project/Cust. ID 100 Area Reacto AIR-100SMT-99-0005

Machine LB5500

Report Date: Tuesday, December 21, 1999

SAF # None

Sample ID	Carrier	Sample Type	Sample Volume	Acquisition Date/Time
19991221133222-A3	37	2-in Air Filter	9622 liters	12/21/99 1:32:33 PM

Net Alpha cpm	Alpha dpm	Alpha dpm 2 sigma	Alpha Bkgd cpm	Net Beta cpm	Beta dpm	Beta dpm 2 sigma	Beta Bkgd cpm
59.440	152.557	12.899	2.250	595.747	999.100	23.313	7.750

MDA (dpm)

Beta Efficiency: 59.53%

Alpha

Beta

62.806

606.192

Alpha Efficiency: 38.72%

Alpha $\mu$ Ci/ml	Alpha uCi/ml 2 sigma	Beta $\mu$ Ci/ml	Beta uCi/ml 2 sigma	Alpha MDC (uCi/ml)	Beta MDC (uCi/ml)
7.1E-12	6.0E-13	4.7E-11	1.1E-12	2.9E-12	2.8E-11

on 12/17 off?

Total Vol. written on envelope  
340 cuft

Frisch Grid

5.2 - 5.4 m.e.v 3 x Bkgd.

Bkg = 8 cts

Avg 22 cts

Hi's L - 27 cts.

COPY

Tom Edwards

Analyzed By:

*29 152*

Date:

12/21/99

Reviewed By:

*SD*

Date:

12/27/99

0039

RQC053

Quanterra Incorporated  
Information Sheet Rad PrepRun Date: 1/06/00  
Time: 16:44:47Parent Batch:  
Associated Batches:\*\*\*\*\*  
\* QC BATCH: 0004330 \*  
\*\*\*\*\*

Page: 1

SN: Americium-241 and Curium-242,243,244 by Analytical Due Date: 1/11/00  
7L: PuAmCm PrpRC5016, SepRC5080(5003)/RC5010  
5I: CLIENT: HANFORD Project Manager: JW2

Lot#	Analyst	Due	Client Name	Geometry	Count	Time	Mid/Ave	Tracer ID	CRDL	Units	Screen	Info - (Ci)	PM
Work Order	Client Matrix	Aliquot					Date/Time	Spike ID			Alpha	Beta	Bin
J0A040157-001 X	1/11/00	Bechtel Hanford,			.000	12/17/99	12:45		1.00E+00	pCi/g	**NYS	**NYS	JW2
D72TH-1-0A FILTER		.0000									306		
Comments: FILTER													
J0A040157-001	1/11/00	Bechtel Hanford,			.000	12/17/99	12:45		1.00E+00	pCi/g	**NYS	**NYS	JW2
D72TH-1-05 FILTER		.0000									306		
Comments: FILTER													
J0A040000-330 B	1/11/00	Bechtel Hanford,				12/17/99	12:45		1.00E+00	pCi/g	**NA	**NA	JW2
D72W8-1-01 BIOLOGICAL													
Comments:													
J0A040000-330 C	1/11/00	Bechtel Hanford,				12/17/99	12:45			pCi/g	**NA	**NA	JW2
D72W8-1-02 BIOLOGICAL													
Comments:													

Total Number of Samples In Batch: 00004

<b>Batch Information:</b>	Dry Wt:	Decay Correct: Y	Blank Sub: None	Call In:
	Uncert: Both	Sigma: 1.960	ODR: Target List + Other Detected	
BLANK CRDL		Tracer Yield	Type	QC Control Limits
Americium 241	1.00E+00		RPD	
Curium 244	1.00E+00		RPD	

\*\* NYS = Not Yet Screened

\*\* NA = Not Applicable

\*\* Other = Other than Gross Alpha or Gross Beta

++ Indicates that Batch Information has changed for this sample. Print worksheet for details.

0040

COC Signature Page  
 W03003

Lot or Batch #: 0004330

Initials/Date Procedure #

Released By	KH 1-4-00	Rich 00009
Received	1-4-00	Rich 0016-2
Released By	1-7-00	1-7-00
Received	QB 1-7-00	CC 0000
Released By	1-12-00	1-12-00
Received	1-12-00	AS 0003-2
Released By	1-12-00	1-12-00
Received	1-13-00	1-13-00
Released By	1-13-00	1-13-00
Received	1-13-00	1-13-00
Released By	1-13-00	1-13-00
Received	1-13-00	1-13-00
Released By	1-13-00	1-13-00
Received	1-13-00	1-13-00

RQC053

Quanterra Incorporated  
Information Sheet Rad Prep

Run Date: 1/06/00  
Time: 16:48:50

Parent Batch:  
Associated Batches:

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\* QC BATCH: 0004329 \*  
\*  
\*\*\*\*\*

Page: 1

SO: Plutonium-238,239/40 by Alpha Spec  
7L: PuAmCm PrpRC5016, SepRC5080(5003)/RC5010  
5I: CLIENT: HANFORD

Analytical Due Date: 1/11/00

Project Manager: JW2

Lot# Work Order	Analyt Due Client Matrix	Client Name Aliquot	Geometry	Count	Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Alpha	Info - (Ci) Beta	PM Bin
J0A040157-001 X D72TH-1-0J FILTER Comments: FILTER	1/11/00	Bechtel Hanford, .0000		.000	12/17/99 12:45		1.0	pCi/g	**NYS 306	**NYS		JW2
J0A040157-001 D72TH-1-04 FILTER Comments: FILTER	1/11/00	Bechtel Hanford, .0000		.000	12/17/99 12:45		1.0	pCi/g	**NYS 306	**NYS		JW2
J0A040000-329 B D72W6-1-01 BIOLOGICAL Comments:	1/11/00	Bechtel Hanford,			12/17/99 12:45		1.0	pCi/g	**NA	**NA		JW2
J0A040000-329 C D72W6-1-02 BIOLOGICAL Comments:	1/11/00	Bechtel Hanford,			12/17/99 12:45			pCi/g	**NA	**NA		JW2

Total Number of Samples In Batch: 00004

Batch Information:

Dry Wt:

Decay Correct: Y

Blank Sub: None

Call In:

Uncert: Both

Sigma: 1.960

ODR: Target List + Other Detected

BLANK CRDL

Plutonium 238 1.0  
Plutonium 239/4 1.0

Tracer Yield

Type  
RPD  
RPD

QC Control Limits

\*\* NYS = Not Yet Screened

\*\* NA = Not Applicable

\*\* Other = Other than Gross Alpha or Gross Beta

++ Indicates that Batch Information has changed for this sample. Print worksheet for details.

0042

COC Signature Page

W03003

Lot or Batch #	Initials/Date	Procedure #
0004329		
Released By	<del>PK</del> 1-4-00	RichRC0009
Received	1-4-00 dx	RichRC5016-2
Released By	1-7-00 dx	n/a
Received	1-7-00 PB	RC5080/5010
Released By	PB 1/11/00	n/a
Received	SP 1/11/00	RC 5039-2
Released By	SP 1/12/00	n/a
Received	CS 1/12/00	RICHARDSTON
Released By	CS 1/12/00	n/a
Received	JMI 1-13-00	Radcalc V&Y
Released By	JMI 1-13-00	n/a
Received	PK 1-13-00	RICHRC0002
Released By	PK 1-13-00	n/a
Received		

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0043

RQC053

Quanterra Incorporated  
Information Sheet Rad Prep

Run Date: 1/04/00  
Time: 15:33:50

Parent Batch:  
Associated Batches:

Page: 1

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\*  
\* QC BATCH: 0004333 \*  
\*  
\*\*\*\*\*

SR: Uranium-234,235,238 by Alpha Spec  
7W: UIso PrpRC5016, SepRC5079(5039)  
5I: CLIENT: HANFORD

Analytical Due Date: 1/11/00

Project Manager: JW2

Lot# Work Order	Analyt Due Client Matrix	Client Name Aliquot	Geometry	Count	Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Alpha	Info - (Ci) Beta	PM Bin
J0A040157-001 X D72TH-1-0C FILTER Comments: FILTER	1/11/00	Bechtel Hanford, .0000		.000	12/17/99 12:45			1.00E+00	pCi/g	**NYS 306	**NYS	JW2
J0A040157-001 D72TH-1-06 FILTER Comments: FILTER	1/11/00	Bechtel Hanford, .0000		.000	12/17/99 12:45			1.00E+00	pCi/g	**NYS 306	**NYS	JW2
J0A040000-333 B D72WF-1-01 BIOLOGICAL Comments:	1/11/00	Bechtel Hanford,			12/17/99 12:45			1.00E+00	pCi/g	**NA	**NA	JW2
J0A040000-333 C D72WF-1-02 BIOLOGICAL Comments:	1/11/00	Bechtel Hanford,			12/17/99 12:45				pCi/g	**NA	**NA	JW2

Total Number of Samples In Batch: 00004

Batch Information:

Dry Wt:

Decay Correct: Y

Blank Sub: None

Call In:

Uncert: Both

Sigma: 1.960

ODR: Target List + Other Detected

BLANK CRDL

Tracer YieldTypeQC Control Limits

Uranium 234

1.00E+00

RPD

Uranium 238

1.00E+00

RPD

\*\* NYS = Not Yet Screened

\*\* NA = Not Applicable

\*\* Other = Other than Gross Alpha or Gross Beta

\*\* Indicates that Batch Information has changed for this sample. Print worksheet for details.

004.1

CCC Signature Page

W03023

Lot or Batch #: 0004333

Initials/Date

Procedure #

Released By	<del>KDA</del> 1-4-00	Rich RC0009
Received	1-4-00	Rich RC 5016-2
Released By	1-7-00	n/a
Received	01-07-00	RC 5079
Released By	01-07-00	n/a
Received	SD 1/7/00	RC 5039-2
Released By	SD 1/10/00	n/a
Received	CA 1/10/00	RC PRD008R1
Released By	CA 1/1/00	n/a
Received	DM 1-11-00	Radcalc V2.4
Released By	DM 1-11-00	n/a
Received	PK 1-12-00	Rich RC0002
Released By	PK 1-13-00	n/a
Received		

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RQC053

Parent Batch:  
Associated Batches::  
:  
:  
:Quanterra Incorporated  
Information Sheet Rad PrepRun Date: 1/04/00  
Time: 15:34:23

Page: 1

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\*  
\* QC BATCH: 0004334 \*  
\*  
\*\*\*\*\*W03003  
TA: Gamma by HPGE  
AW: Gamma Prep RC5017  
SI: CLIENT: HANFORD

Analytical Due Date: 1/11/00

Project Manager: JW2

Lot# Work Order	Analyt Due Client Matrix	Client Name Aliquot	Name Geometry	Count Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Alpha	Info - (Ci) Beta	PM Bin
J0A040157-001 X D72TH-1-0D FILTER Comments: FILTER	1/11/00	Bechtel Hanford, .0000		.000	12/17/99 12:45		5.00E-02	pCi/g	**NYS 306	**NYS	JW2
J0A040157-001 D72TH-1-03 FILTER Comments: FILTER	1/11/00	Bechtel Hanford, .0000		.000	12/17/99 12:45		5.00E-02	pCi/g	**NYS 306	**NYS	JW2
J0A040000-334 B D72WJ-1-01 BIOLOGICAL Comments:	1/11/00	Bechtel Hanford,			12/17/99 12:45		5.00E-02	pCi/g	**NA	**NA	JW2
J0A040000-334 C D72WJ-1-02 BIOLOGICAL Comments:	1/11/00	Bechtel Hanford,			12/17/99 12:45			pCi/g	**NA	**NA	JW2

Total Number of Samples In Batch: 00004

Batch Information:

Dry Wt:

Decay Correct: Y

Blank Sub: None

Call In:

Uncert: Both

Sigma: 1.960

ODR: Target List + Other Detected

BLANK CRDL

Cobalt 60	5.00E-02
Cesium 137	1.00E-01
Europium 152	1.00E-01
Europium 154	1.00E-01
Europium 155	1.00E-01

Tracer YieldTypeQC Control Limits

RPD
RPD
RPD
RPD
RPD

\*\* NYS = Not Yet Screened

\*\* NA = Not Applicable

\*\* Other = Other than Gross Alpha or Gross Beta

++ Indicates that Batch Information has changed for this sample. Print worksheet for details.

0046

## CCC Signature Page

WU3003

Lot or Batch #: 0004334

**Initials/Date**

Procedure #

Released By

~~KA~~ 1-4-00

Richard

Received

Page 1-4-00

5017-2  
RICHIE C. ~~100~~ size 1-5 TV

Released By

Doc 1-5-02

513

Received

nd 1/5/00

R11421000T

Released By

03/6/52

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Respectfully,

PK 1-4-00

RLHKKGGG

Revised 3v

$P_1 < 1 - 6.00$

34

## Received

Released By:

342

Received

Released By

2/1

Received

Released By

2/1

Received

RC-131, Rev. 1, 5/99

RQC053

Parent Batch:  
Associated Batches:Quanterra Incorporated  
Information Sheet Rad PrepRun Date: 1/04/00  
Time: 16:17:40

Page: 1

\*\*\*\*\*  
\* QC BATCH: 0004353 \*  
\*\*\*\*\*

W03003

S9: Gross Alpha and Beta by GPC using Pu-239 Analytical Due Date: 1/11/00  
BE: Gross Alpha/Beta PrpRC5036  
SI: CLIENT: HANFORD

Project Manager: JW2

Lot# Work Order	Analyt Due Client Matrix	Client Name Aliquot Geometry	Count Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Alpha	Info - (Ci) Beta	PM Bin
J0A040157-001 D72TH-1-0G FILTER Comments: FILTER	1/11/00	Bechtel Hanford, .0000	.000	12/17/99 12:45		10	pCi/g	**NYS 306	**NYS	JW2
J0A040000-353 B D730E-1-01 BIOLOGICAL Comments:	1/11/00	Bechtel Hanford,		12/17/99 12:45		10	pCi/g	**NA	**NA	JW2
J0A040000-353 C D730E-1-02 BIOLOGICAL Comments:	1/11/00	Bechtel Hanford,		12/17/99 12:45			pCi/g	**NA	**NA	JW2

Total Number of Samples In Batch: 00003

Batch Information:

Dry Wt: ?

Decay Correct: Y

Blank Sub: None

Call In:

Uncert: Both

Sigma: 1.960

ODR: Target List + Other Detected

BLANK CRDL

Tracer YieldTypeQC Control Limits

Gross Alpha 10

RPD

Gross Beta 15

RPD

\*\* NYS = Not Yet Screened

\*\* NA = Not Applicable

\*\* Other = Other than Gross Alpha or Gross Beta

++ Indicates that Batch Information has changed for this sample. Print worksheet for details.

0048

3000000

SSHXO

**Procedure #**

14-00

Q2-7-1

22-4-1 2015

500 e/h/1 1/2

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RQC053

Parent Batch:  
Associated Batches:Quanterra Incorporated  
Information Sheet Rad PrepRun Date: 1/06/00  
Time: 17:11:31

Page: 1

\*\*\*\*\*  
\* QC BATCH: 0006412 \*  
\*\*\*\*\*

6003003

7day

S4: Nickel by ICP and Nickel-63 by Liquid Sc Analytical Due Date: 1/11/00  
AA: Ni-63 PrpRC5016, SepRC5069  
SI: CLIENT: HANFORD

Project Manager: JW2

Lot# Work Order	Client	Analyt Due Matrix	Client Name Aliquot	Geometry	Count	Time	Mid/Ave Date/Time	Tracer ID Spike ID	CRDL	Units	Screen Info - (Ci) Alpha	Beta	PM Bin
J0A040157-001 D72TH-1-0H FILTER Comments: FILTER		1/11/00	Bechtel Hanford, .0000		.000	12/17/99 12:45			3.00E+01	pCi/g	**NYS 306	**NYS	JW2
J0A040157-001 S D72TH-1-0K FILTER Comments: FILTER		1/11/00	Bechtel Hanford, .0000		.000	12/17/99 12:45				pCi/g	**NYS 306	**NYS	JW2
J0A040157-001 X D72TH-1-0L FILTER Comments: FILTER		1/11/00	Bechtel Hanford, .0000		.000	12/17/99 12:45			3.00E+01	pCi/g	**NYS 306	**NYS	JW2
J0A060000-412 B D7616-1-01 BIOLOGICAL Comments:		1/11/00	Bechtel Hanford,			12/17/99 12:45			3.00E+01	pCi/g	**NA	**NA	JW2
J0A060000-412 C D7616-1-02 BIOLOGICAL Comments:		1/11/00	Bechtel Hanford,			12/17/99 12:45				pCi/g	**NA	**NA	JW2

Total Number of Samples In Batch: 00005

Batch Information:

Dry Wt: ?

Decay Correct: Y

Blank Sub: None

Call In:

Uncert: Both

Sigma: 1.960

ODR: Target List + Other Detected

BLANK CRDL

Nickel 63

3.00E+01

Tracer YieldType  
RPDQC Control Limits

\*\* NYS = Not Yet Screened

\*\* NA = Not Applicable

\*\* Other = Other than Gross Alpha or Gross Beta

++ Indicates that Batch Information has changed for this sample. Print worksheet for details.

0050

7day

**COC Signature Page**

W03003

Lot or Batch #	Initials/Date	Procedure #
0006412		
Released By		
Received	Doc 1-6-00	RICHRC 5016-2
Released By	Doc 1-7-00	n/a
Received	AB 1-7-00	RC 5069
Released By	AB 1-19-00	n/a
Received	AB 1/19/2000	RICHRC 5001/1801
Released By	CS 1/28/00	n/a
Received	1/21/00 JW 1/21/00	RICHRC 0003/2
Released By	JW 1/21/00	n/a
Received		
Released By		n/a
Received		
Released By		n/a
Received		

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